IN THE CLAIMS

Please amend the claims as shown in the listing of claims below.

Claims 1-37 (Canceled)

Claim 38. (Currently Amended) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member, the GaN single crystal having an n-type carrier concentration within a range of 1 x 10^{17} cm^{-3} to 1 x 10^{19} cm^{-3};

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port; and

cutting said ingot into a plurality of GaN single crystal substrates ~~sheets~~, each GaN single crystal substrate having an n-type carrier concentration within a range of 1 x 10^{16} cm^{-3} to 1 x 10^{20} cm^{-3}.

Claim 39. (Currently Amended) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member, the GaN single crystal having an n-type carrier concentration within a range of 1 x 10^{17} cm^{-3} to 1 x 10^{19} cm^{-3};

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port; and

cleaving said ingot into a plurality of GaN single crystal substrates ~~sheets~~, each GaN single crystal substrate having an n-type carrier concentration within a range of 1 x 10^{16} cm^{-3} to 1 x 10^{20} cm^{-3}.

Claims 40-58 (Canceled)

Claim 59 (Currently amended) A method of making ~~as~~ a GaN single crystal substrate as claimed in claim 38, where said growth apparatus is a vertical furnace and said growing of said epitaxial layer is by HVPE.

Claim 60 (Currently amended) A method of making ~~as~~ a GaN single crystal substrate as claimed in claim 39, where said growth apparatus is a vertical furnace and said growing of said epitaxial layer is by HVPE.

Claim 61 (New) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member;

said GaN single crystal substrate being made by forming on a GaAs substrate a mask layer having a plurality of opening windows disposed separate from each other;

growing on said mask layer an epitaxial layer made of GaN;

eliminating said GaAs substrate;

and before said epitaxial layer growing, forming a buffer layer on said GaAs substrate in said opening windows of said mask layer;

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port;

and

cutting said ingot into a plurality of GaN single crystal substrates.

Claim 62 (New) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member;

said GaN single crystal being made by forming a buffer layer on a GaAs substrate;

growing on said buffer layer a lower epitaxial layer made of GaN;

forming on said lower epitaxial layer, a mask layer having a plurality of opening windows disposed separate from each other, the mask layer having a thickness in the range of 0.05 um to 0.5 um; and

growing on said mask layer an upper epitaxial layer made of GaN,

wherein said mask layer forming includes arranging said plurality of opening windows with a pitch L in a <10-10> direction of said lower epitaxial layer so as to form a <10-10> window group, and arranging a plurality of <10-10> window groups in parallel with a pitch d ($0.75L \leq d \leq 1.3L$) in a <1-210> direction of said lower eptiaxial layer;

wherein said upper epitaxial layer growing includes initially growing a hexagonal pyramid shaped crystal in each of said opening windows whereafter each crystal connects with other crystals on said mask layer without interstices therebetween, and

wherein said opening windows of said mask layer are rectangular windows in an oblong form having a longitudinal direction aligning in a <10-10> direction of said lower epitaxial layer, a plurality of said rectangular windows being arranged with a pitch L in said <10-10> direction so as to form a <10-10> rectangular window group, a plurality of <10-10> rectangular window groups being arranged in parallel with a pitch d in a <1-210> direction of said epitaxial layer

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port, said GaN single crystal having a GaN single crystal substrate; and

cutting said ingot into a plurality of GaN single crystal substrates.

Claim 63 (New) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member;

said GaN single crystal substrate being made by forming a buffer layer on a GaAs substrate;

growing on said buffer layer a lower epitaxial layer made of GaN;

forming on said lower epitaxial layer, a mask layer having a plurality of opening windows disposed separate from each other, the mask layer having a thickness in the range of 0.05 um to 0.5 um; and

growing on said mask layer an upper epitaxial layer made of GaN,

wherein said mask layer forming includes arranging said plurality of opening windows with a pitch L in a <10-10> direction of said lower epitaxial layer so as to form a <10-10> window group, and arranging a plurality of <10-10> window groups in parallel with a pitch d ($0.75L \leq d \leq 1.3L$) in a <1-210> direction of said lower eptiaxial layer;

wherein said upper epitaxial layer growing includes initially growing a hexagonal pyramid shaped crystal in each of said opening windows whereafter each crystal connects with other crystals on said mask layer without interstices therebetween, and

wherein each of said opening windows of said mask layer is a hexagonal window formed like a hexagonal ring, each of the six sides of said hexagonal window aligning with a <10-10> direction of said lower epitaxial layer;

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port; and

cutting said ingot into a plurality of GaN single crystal substrates.

Claim 64 (New) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member;

said GaN single crystal substrate being made by forming on a GaAs substrate a mask layer having a plurality of opening windows disposed separate from each other;

growing on said mask layer an epitaxial layer made of GaN;

eliminating said GaAs substrate;

and before said epitaxial layer growing, forming a buffer layer on said GaAs substrate in said opening windows of said mask layer;

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port; and

cleaving said ingot into a plurality of GaN single crystal substrates.

Claim 65 (New) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member;

said GaN single crystal being made by forming a buffer layer on a GaAs substrate;

growing on said buffer layer a lower epitaxial layer made of GaN;

forming on said lower epitaxial layer, a mask layer having a plurality of opening windows disposed separate from each other, the mask layer having a thickness in the range of 0.05 um to 0.5 um; and

growing on said mask layer an upper epitaxial layer made of GaN,

wherein said mask layer forming step includes arranging said plurality of opening windows with a pitch L in a <10-10> direction of said lower epitaxial layer so as to form a <10-

10> window group, and arranging a plurality of <10-10> window groups in parallel with a pitch d (0.75L≤d≤1.3L) in a <1-210> direction of said lower eptiaxial layer;

wherein said upper epitaxial layer growing includes initially growing a hexagonal pyramid shaped crystal in each of said opening windows whereafter each crystal connects with other crystals on said mask layer without interstices therebetween, and

wherein said opening windows of said mask layer are rectangular windows in an oblong form having a longitudinal direction aligning in a <10-10> direction of said lower epitaxial layer, a plurality of said rectangular windows being arranged with a pitch L in said <10-10> direction so as to form a <10-10> rectangular window group, a plurality of <10-10> rectangular window groups being arranged in parallel with a pitch d in a <1-210> direction of said epitaxial layer,

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port; and

cleaving said ingot into a plurality of GaN single crystal substrates.

Claim 66 (New) A method of making a GaN single crystal substrate in a growth apparatus including a reaction chamber, a gas introducing port, an exhaust port, a resistance heater, and a rotary support member, said method comprising:

placing a GaN single crystal employed as a seed crystal on said rotary support member;

said GaN single crystal being made by forming a buffer layer on a GaAs substrate;

growing on said buffer layer a lower epitaxial layer made of GaN;

forming on said lower epitaxial layer, a mask layer having a plurality of opening windows disposed separate from each other, the mask layer having a thickness in the range of 0.05 um to 0.5 um; and

growing on said mask layer an upper epitaxial layer made of GaN,

wherein said mask layer forming includes arranging said plurality of opening windows with a pitch L in a <10-10> direction of said lower epitaxial layer so as to form a <10-10> window group, and arranging a plurality of <10-10> window groups in parallel with a pitch d (0.75L≤d≤1.3L) in a <1-210> direction of said lower eptiaxial layer;

wherein said upper epitaxial layer growing includes initially growing a hexagonal pyramid shaped crystal in each of said opening windows whereafter each crystal connects with other crystals on said mask layer without interstices therebetween, and

wherein each of said opening windows of said mask layer is a hexagonal window formed like a hexagonal ring, each of the six sides of said hexagonal window aligning with a <10-10> direction of said lower epitaxial layer;

forming an ingot of GaN single crystal by growing an epitaxial layer made of GaN on said GaN single crystal employed as said seed crystal, while said rotary support member is at a certain distance from said gas introducing port; and

cleaving said ingot into a plurality of GaN single crystal substrates.

Claim 67. (New) A method of making a GaN single crystal substrate as claimed in claim 61, where said growth apparatus is a vertical furnace and said growing of said epitaxial layer is by HVPE.

Claim 68 (New) A method of making a GaN single crystal substrate as claimed in claim 62, where said growth apparatus is a vertical furnace and said growing of one of said lower and upper epitaxial layer is by HVPE.

Claim 69. (New) A method of making a GaN single crystal substrate as claimed in claim 63, where said growth apparatus is a vertical furnace and said growing one of said lower and upper epitaxial layer is by HVPE.

Claim 70 (New) A method of making a GaN single crystal substrate as claimed in claim 64, where said growth apparatus is a vertical furnace and said growing of said epitaxial layers is by HVPE.

Claim 71. (New) A method of making a GaN single crystal substrate as claimed in claim 65, where said growth apparatus is a vertical furnace and said growing one of said lower and upper epitaxial layer is by HVPE.

Claim 72 (New) A method of making a GaN single crystal substrate as claimed in claim 66, where said growth apparatus is a vertical furnace and said growing one of said lower and upper epitaxial layer is by HVPE.